

Computer Assisted Handicraft Course Instruction

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Abstract

In special education, instructional objectives of handicraft course include the training of skills and cultivation of creativity. In previous literature, computer-assisted instruction can effectively enhance the learning motivations of students with intellectual disability. By a handicraft course, this study has observed the effectiveness of computer -assisted instruction. In the case, the teacher designed interactive instructional program based on the students and the course requirements. The observation found that the students could easily generalize the experience of using the instructional program to the classes (real situations), thus their logic and reasoning capability were improved.

Keywords

Special Education; People with Intellectual Disabilities; Handicraft; Interactive Game; Computer-Assisted Instruction

Introduction

Recently, the author attended a course, "Interactive Game Software Application", for a training totally 21 hours, in which, the meaning of "Computer Interactive Game" was learnt. After the completion of the training, the learnt in the course was applied to the author's teaching, which did increase the vitality and abundance of teaching. As well it was discovered that the students can easily analogize their experiences in operating the educational software to the classes (real scenario) so as to increase the students' logic and rational abilities, reducing the time on preparing the teaching materials.

Before taking the training, the interactive teaching software has been applied in the market as a part of teaching materials for a long time. However, the contents and degrees were difficult to fit the requirements of students, and they were easy to frustrate students and lower their learning motivations. Teachers need to count on the demand of each student to prepare the teaching materials since the differences among individuals of special students are significant. However, it is difficult for the field

expert to develop related interactive teaching software which is oriented to the field of special education.

The intelligent qualities of the author's students are between 55 and 65, belonging to middle mental retardation(Lu, Huang, Lin, & Zhu, 2000), who are dependent on self-care and self-living, as well as others for long-term care. Such kind of students shows characteristics of no fixed concentration, poor memory and identification, thinking and reasoning ability, and they are also not good at organization of learning materials(Bley & Thornton, 1981; Heward, 2012; Thomas, 1996; Westling & Fox, 2000).

Poor learning ability makes their learning motivation low. Thus in the face of challenging study or work, they are easily to withdraw or impose reliance on others for assistance. Therefore, considering the physical and mental development of people with mental retardation, the material design should be plain, understandable and lively to adapt to their physical and mental development. Combined with daily life and work experience, the selection of materials should be based on students' interest and ability in learning. As to teaching strategies, they must be designed and operated in sequence systematically. For analysis of teaching materials, detailed performance analysis is employed to meet individual needs, which is conducive to the implementation of teaching activities. Systematic instructional strategies are used to give guidance on students' learning (Editor, 1997; Hasselbring & Glaser, 2000).

With the rapid development of information technology, the application of information technology has already become the trend in all sectors, without exception in education. Integrating information technology into teaching has become a teaching trend in the world. Information technology can provide text, sound, graphics, animation, video and other media channels to transmit varieties of teaching media materials and offer interesting learning experience for learners, which helps to improve their learning

motivation and concentration (Budoff, Thormann, & Gras, 1984; Christmann, 1977; Jordan, 1988; Roblyer, 1985).

Computer Interactive Game

Interactive games are the most popular form in computer assisted instruction. Combining learning and game highly enhances users' attention and develops their logic of knowledge and motor skills (such as: hand-eye coordination) (Budoff et al., 1984; Hansselbring, 1985; Polloway, Patton, & Serna, 2007; Cihak, D., et al, 2010). The concept of Game-based teaching design oriented to interaction gradually gets more and more attention from teachers. The vivid content increases students' interest in learning.

In terms of the field standard, the participators in the production of interactive multimedia materials include: project manager, curriculum planning and designing personnel, engineer in software program, art designer, animator, music procedures. For teachers engaged in special education who have not received any professional training, the production of interactive multimedia materials is extremely difficult.

In this article, the animation software, "SCRATCH" was applied to make an artifact course and the learning results of students were regarded as the reference for other teachers who apply computer assistance teaching. "SCRATCH" established by MIT Media Lab, is a free software with which teachers can download interactive teaching materials.

"Paper Tole" Course Application

Course Content

"Paper Tole" was originated from relief painting of 15th century. In the 17th century, the craftsmen in Venice, Italy, created the effects of layers and stacking using the same printed images. In the 18th century, it was introduced to Asia. In this instructional unit, three techniques, "drawing", "cutting" and "pasting" are used to present the students' personal drawing style. Thus, the students can enjoy the fun in production and cultivation of the interest in creation.

Course Purpose

Cognitive capability of "What to do?" and "How to do?" required in handicraft course is accumulated by procedural knowledge. Students need to adjust their cognitive process under the guidance of teachers. The

purposes to design the computer-assisted instructional software are below:

1. By computer-assisted instruction, students are guided to adjust cognitive process.
2. Producing instructional materials by Free Software can reduce the limitation of time, space and finance, as well lower the teachers' learning cost.
3. The software can help parents to understand the students' creation process, thus enhancing parent-children interaction.

Instructional steps and objective

According to the instructional content, the unit is simplified into four steps to produce the interactive instructional program (see FIGURE 1): (1) prepare tools; (2) drawing; (3) cutting; (4) pasting. Instructional objectives of the steps are shown below (see TABLE 1).



FIGURE 1 FRAMEWORK OF INSTRUCTIONAL STEPS

TABLE 1 INSTRUCTIONAL OBJECTIVES

Instructional steps	Instructional objectives
(1) Preparing tools	The students can prepare the tools according to the teacher's instruction.
(2) Drawing	The students can color the base pictures by different materials.
(3) Cutting	The students can use the scissors safely and cut the pictures according to the teacher's instruction.
(4) Pasting	The students can paste the pictures on base picture according to the teacher's instruction.

The Game Scripts of Design

According to teaching steps, 4 scenarios of interactive games are designed and described as following: (see FIGURE 2).

Preparing Tools

Before the practice: the students are asked to put the right tools in the schoolbags.

After the practice: the tools needed (crayons and the scissors) disappear because of being put in the schoolbags; the tools which are not needed cannot be put in the schoolbags (cutters, color pens and glues).

Drawing

Before the practice: the students are guided to distinguish and select "crayons" and "water painting brush".

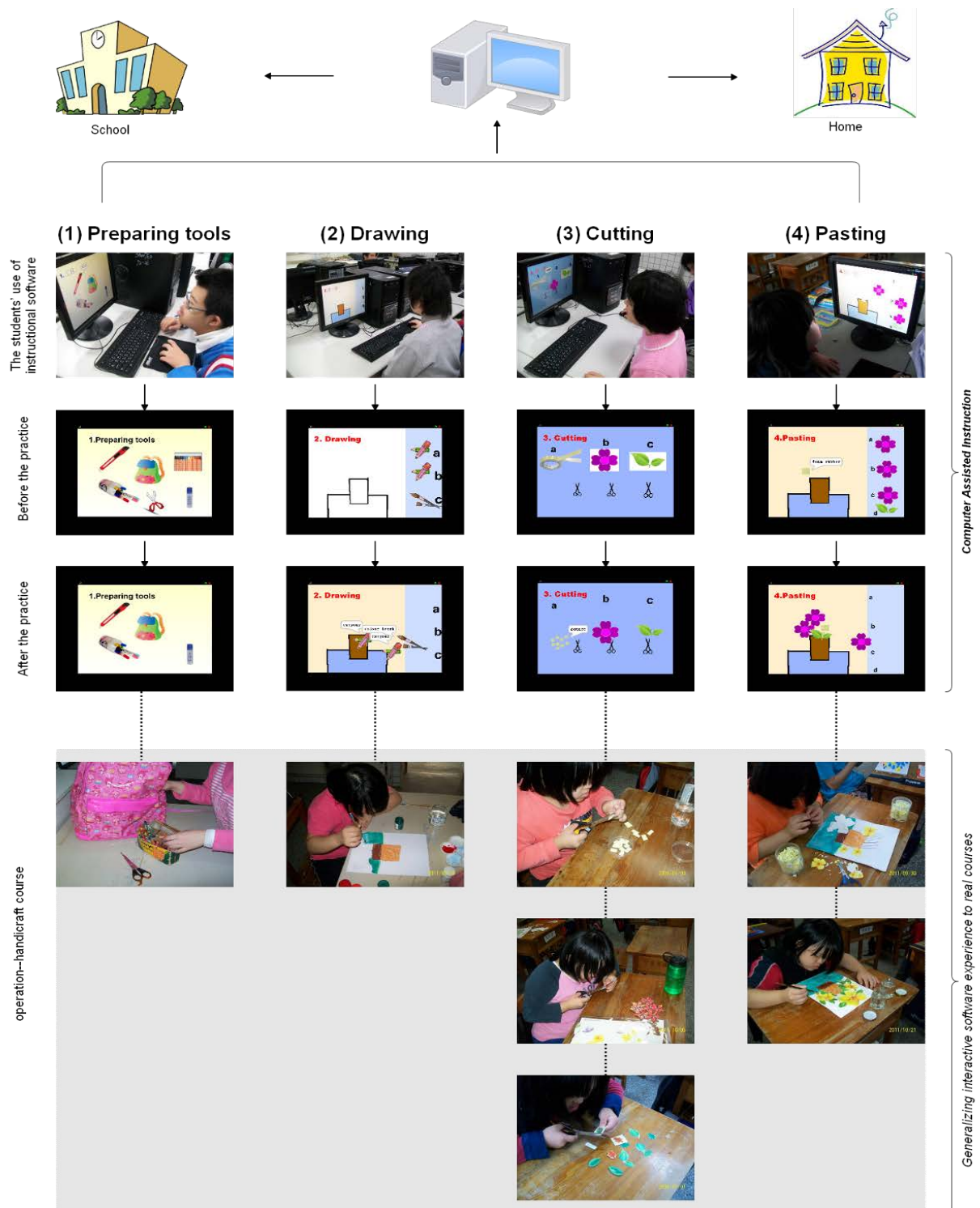


FIGURE 2 FRAMEWORK OF THE GAME SCRIPTS

After the practice: According to steps A, B and C, the students recognize the drawing of base picture.

Cutting

Before the practice: the students are asked to select "foam rubber", "flowers" and "leaves".

After the practice: according to steps A, B and C, the students recognize the process to cut foam rubber,

flowers and leaves.

Pasting

Before the practice: the students are asked to distinguish and select the cut "foam rubber", "flowers" and "leaves".

After the practice: according to steps A, B, C and D, the students recognize the process to paste the cut

foam rubber, flowers and leaves on base picture.

How do Students Complete Real Works?

Traditional handicraft courses combine multimedia technology making course contents into interactive game materials. Through the stage in each step, students can learn the skills and procedure of making "Paper Pole". For example: in the game from step 1 (Preparing tools), they can learn how to prepare independently proper tools; in the game from step 2 (Drawing), they can learn how to draw independently vase on a piece of drawing paper; in the game from step 3 (Cutting), they can learn how to cut petals and leafs; in the game from step 4 (Pasting), they can learn how to paste the petals and leafs onto the drawing paper with painted vase.

Interactive game materials can help students complete their own works independently without relying on the teacher's demonstration of each step, reducing teachers' demonstrative teaching in classes, which not only avoids the occurrence of copying the demonstrations but also further enhances students' creativity.

Instructional Effectiveness

Students

1. **Enhancing the students' learning motive:** by interactive games, learning content is simplified, enhancing the students' problem-solving capability, sparking the students' thinking and creativity, increasing the students' learning interest, and lifting the learning atmosphere of the classes.
2. **Deigning instructional materials according to the students' capabilities:** the teachers can design proper interactive games according to different units and students. They do not have to depend on software developers or use the instructional software in the market.
3. **Generalizing interactive software experience to real courses:** the students easily generalize the experience to use the interactive software to handicraft course to enhance logic, reasoning and independent learning capabilities (see FIGURE 3).



FIGURE 3 THE STUDENTS' WORKS

Teachers

1. **Reducing the teachers' learning cost:** the teachers usually have to spend several months learning professional animation software. As commercial software is copyrighted and teachers may not be able to afford the cost, using Free Software to design instructional materials will not be limited by space, time and cost.

2. **Shortening the teachers' preparation time:** special education instruction is mostly based on flash cards or real objects. The production process is purchase → taking pictures → making flash cards → producing teaching aids, which is time-consuming. Using computer-assisted instruction, the production elements can be reused to reduce the re-production time.

Instruction

1. **Reducing the production cost of traditional teaching aids:** Traditional flash cards or practical teaching aids cannot be designed for individual students. With computer-assisted instruction, the students can learn the instructional materials at the same time, thus reducing the teachers' costs to produce teaching aids.

2. **Developing database of instructional materials:** By the reorganization of online database, there will be no limitation of time and space. Instructional concepts and resources will be co-created and shared to accomplish the exchange and sharing of online instructional resources, and thus a barrier-free technology learning environment is created.

Summary

Teaching media using interactive games helps to improve the teaching quality, diversity enlightening, and the study of unity and autonomy. It's more helpful for the people with moderate mental retardation to focus attention and promote learning motivation and worthwhile for the special education teachers to consider how to apply it in the teaching and realizing its effects. The process of making up the media teaching materials is provided for students, to improve the teaching quality and avoid puzzle for the designers. Free software has solved the former problem of business copyright, lowered the teachers' economic burden, and also information technologies implied into teaching was realized.

That information technologies applied to special education does not mean that it replaces the

traditional education. Teachers can make a big difference through the media materials, and thus students' interest in learning gets promoted.

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